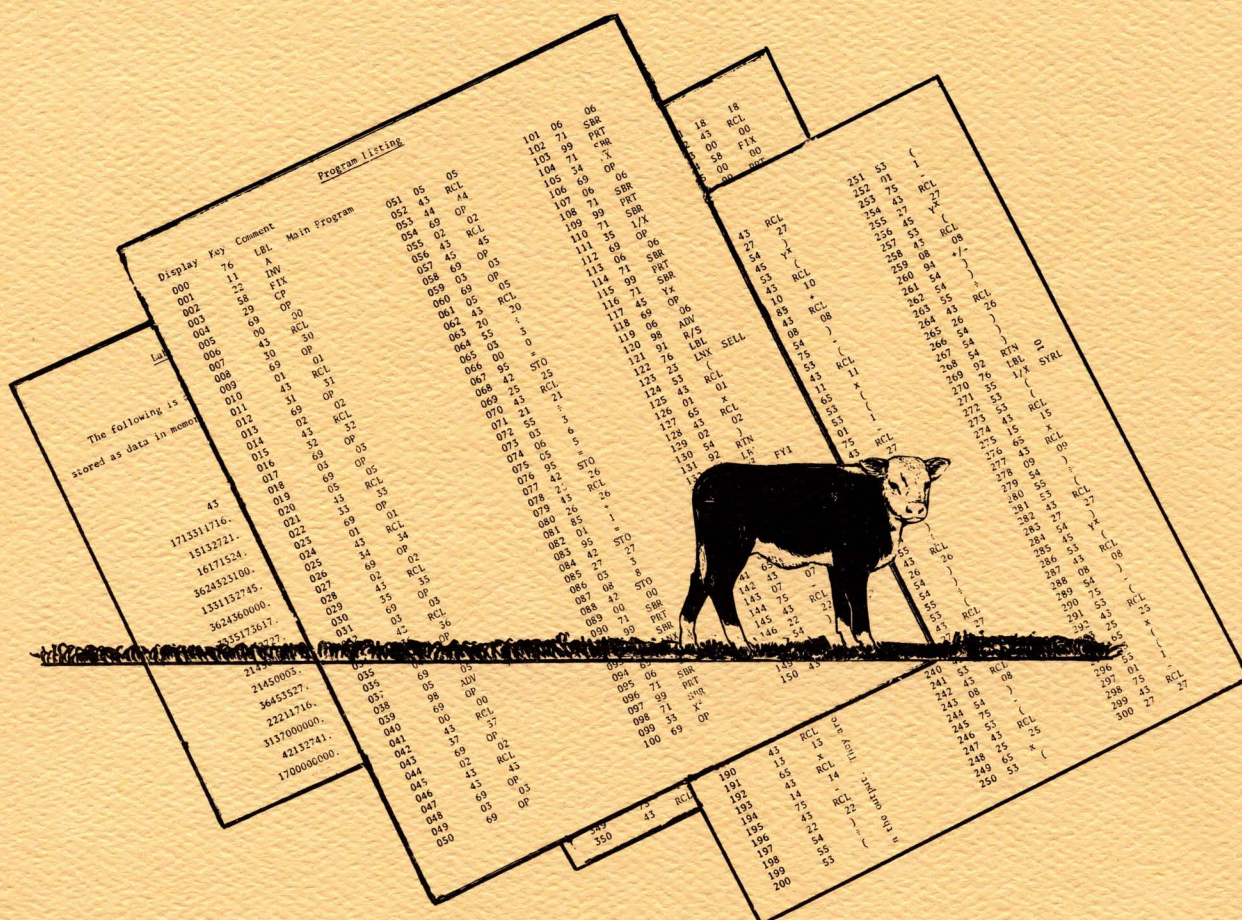


WEANED CALF DECISION ANALYSIS

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WEANED CALF DECISION ANALYSIS

**Programmed for the Texas Instruments programmable calculator, Model 59,
and available upon request for the Apple II Computer.**

PingSun Leung and Burton J. Smith¹

INTRODUCTION:

There are five basic marketing alternatives faced by cattlemen in Hawaii with respect to their weaned calves: sell as weaners, sell as yearlings, raise to slaughter weights and sell on the grass-fed market, raise to yearlings before consignment to a feedyard, or consign the weaners to a feedyard. In 1980, the grass-fed market accounted for 24.8 percent of total cattle marketings in Hawaii, while the grain-fed market accounted for 52.6 percent (Schermerhorn et al., 1982). The major feedyards and slaughter facilities are on Oahu, while the major production areas are on the outer islands. Consequently, if the animals are consigned to a feedyard, there is a transportation cost involved, as well as a stress factor for the animal. As a direct result of the ocean voyage and the time involved, animals commonly shrink 12 to 13 percent; this in turn requires that the animals remain in the feedyard an additional 20 days or so, just to recover this weight loss (Schermerhorn et al., 1982).

The profitability on any lot of cattle depends heavily on making the "right" marketing decision. Since many of the variables that determine the profitability of a particular group of animals fluctuate widely over a short period of time, ranchers often have to reassess their marketing decisions,

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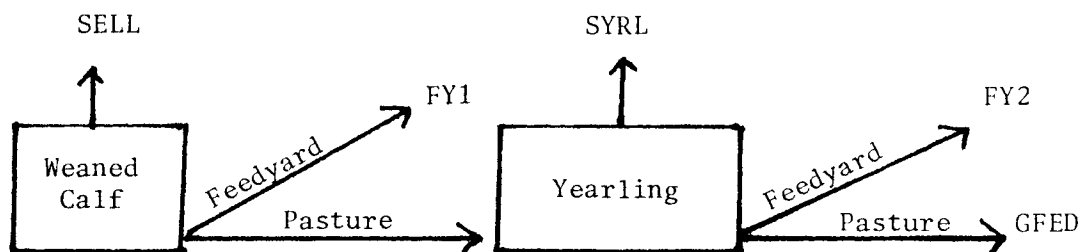
sometimes on short notice. The following program is designed to assist ranchers in making these decisions.

OBJECTIVE:

The objective of this program is to facilitate the evaluation of the various marketing alternatives that ranchers in Hawaii face with their weaned calves. The program will calculate the present values per animal, for each of the following five alternatives:

1. Sell the weaned calf (SELL)
2. Place the weaned calf in feedyard (FY1)
3. Keep the weaned calf on pasture for a few months before placement in feedyard (FY2)
4. Keep the weaned calf on pasture for a few months and sell as yearling (SYRL)
5. Keep the weaned calf on pasture until slaughter weight and sell as grass-fed (GFED)

The flow chart of the five alternatives can be represented in the following diagram:



INPUT VARIABLES AND EXAMPLE DATA:

Listed in Table 1 are the 22 input variables and their memory locations. Values for the sample input variables were calculated based on data from 1980

and 1981. Consequently they do not reflect today's situation, but are included for illustrative purposes only. Some of the inputs will change rapidly over short periods of time (selling price, interest rates, cost per day in feedyard, etc.), while others are relatively stable (carcass percentage, final liveweight, transportation cost, etc.). Still others reflect unique conditions found only on a particular ranch (rate of gain on pasture, weight to be sold, cost of keeping animal on pasture, etc.).

It is important that all input variables be the best values available, as the program is only as good as the information fed into it.

PROGRAM OUTPUT:

The output of the program is shown below:

WEANED CALF DECISION ANALYSIS

Present Value

285.00	SELL
267.39	FY 1
125.36	FY 2
148.24	SYRL
135.63	GFED

PROGRAM OPERATION:

This program is stored on one magnetic strip, while the labels are stored on another. They can be loaded into the calculator by entering

1. INV 2nd WRITE (load strip 1, side 1)
2. INV 2nd WRITE (load strip 1, side 2)--program
3. INV 2nd WRITE (load strip 2, side 1)--labels

(Note: A flashing number on the calculator display indicates that the program has not been properly entered. Press 2nd CP, followed by INV 2nd FIX, then reload the strips again.)

Table 1. Input Variable and Example Data

Input Variable Number	Variable Definitions	Variable Names	Units	Memory Location	Example Data
1	Weaning weight	W1	lb.	01	475
	<u>For alternative SELL:</u>				
2	selling price (liveweight)	S1	\$/lb.	02	0.60
	<u>For alternative FY1:</u>				
3	days in feedyard	FD2	days	03	138
4	cost per day in feedyard	FC2	\$/day	04	2.60
5	final liveweight	W2	lb.	05	943
6	carcass percentage	C2	decimal	06	0.55
7	selling price (carcass weight)	S2	\$/lb.	07	1.25
	<u>For alternative FY2:</u>				
8	days on pasture	PD3	days	08	300
9	yearling weight	W4	lb.	09	675
10	days in feedyard	FD3	days	10	147
11	cost per day in feedyard	FC3	\$/day	11	2.75
12	final liveweight	W3	lb.	12	1050
13	carcass percentage	C3	decimal	13	0.55
14	selling price (carcass weight)	S3	\$/lb.	14	1.25
	<u>For alternative SYRL:</u>				
15	selling price (liveweight)	S4	\$/lb.	15	0.47
	<u>For alternative GFED:</u>				
16	total days on pasture	PD5	days	16	720
17	final liveweight	W5	lb.	17	1150
18	carcass percentage	C5	decimal	18	0.52
19	selling price (carcass weight)	S5	\$/lb.	19	0.95
	<u>Other input information:</u>				
20	cost for keeping an animal on pasture	PC	\$/month	20	15
21	annual interest rate	i	decimal	21	0.10
22	transportation cost for alter- natives FY1, FY2, and GFED	T	\$/animal	22	5.0

After the program has been entered into the machine, the input data are entered into the appropriate memory locations. It is not necessary to manually store the input data, since this program has an automatic feature that stores inputs in their respective locations. The correct sequence of input entries is given in the above section on input variables and example data: input #1 must be entered first, followed by #2, etc. In order to use the automatic feature, enter the value for input #1, press E, enter the value for #2, press E, and continue until all 22 values have been entered.

Changes in individual input values may be made by entering the desired value into the calculator and then pressing STO, followed by the correct memory location.

To start the program, press A. The output will be listed as shown in the section on program output.

If an input value is not known exactly, a range of values may be used. Determine a best guess, then take a 5 or 10 percent variation on each side. For example, if selling price of the carcass is thought to be \$.95, use \$.90 and \$1.00 on successive runs. The program will retain the information fed into memory until a new value is added to that location, or until the machine is turned off. This type of operation also allows "What if" types of questions to be evaluated. For example, how will the selling price of \$1.00 instead of \$1.25 affect the marketing decision. By this method the sensitivity of the various input data may be determined.

To obtain a listing of input data used in a particular run, press B.

This program may also be used for any other type of livestock operation, as long as the required input information is available.

REFERENCE:

Schermerhorn, R.W., P. Garrod, and C.T.K. Ching. 1982. A description of the market organization of the Hawaii beef industry. University of Hawaii, CTAHR Information Text Series 011.

Appendix I

Method and Equations

Since the timings of the flows of money are different for the five alternatives, present values are used to standardize comparison. Present value (PV) refers to the current value of a sum of money to be received in the future.

The present values are discounted daily and the uniform daily charges are discounted using the following formula:

$$\text{Present value of charges} = \text{daily charges} \times \frac{1 - (1 + ii)^{-\# \text{ of days}}}{ii}$$

$$\text{where } ii = \frac{i}{365} \text{ (= daily interest rate).}$$

The variable names used are as defined in Table 1.

The present value formulas for each of the alternatives are as follows:

Alternative SELL

$$\begin{aligned} \text{PV} &= \text{revenue from sale of animal} \\ &= W1 \times S1 \end{aligned}$$

Alternative FY1

$$\begin{aligned} \text{PV} &= \text{discounted revenues from sale of animal, net of transportation cost} - \text{discounted feedyard costs} \\ &= \frac{W2 \times C2 \times S2 - T}{(1 + ii)^{FD2}} - FC2 \times \frac{1 - (1 + ii)^{-FD2}}{ii} \end{aligned}$$

Alternative FY2

$$\begin{aligned} \text{PV} &= \text{discounted revenues from sale of animal, net of transportation cost} - \text{discounted feedyard costs} - \text{discounted pasture costs} \\ &= \frac{W3 \times C3 \times S3 - T}{(1 + ii)^{(FD3 + PD3)}} - FC3 \times \frac{1 - (1 + ii)^{-FD3}}{ii} \times \frac{1}{(1 + ii)^{PD3}} \\ &\quad - \frac{PC}{30} \times \frac{1 - (1 + ii)^{-PD3}}{ii} \end{aligned}$$

Alternative SYRL

PV = discounted revenues from sale of animal - discounted pasture costs

$$= \frac{W4 \times S4}{(1 + ii)^{PD3}} - \frac{PC}{30} \times \frac{1 - (1 + ii)^{-PD3}}{ii}$$

Alternative GFED

PV = discounted revenues from sale of animal, net of transportation cost - discounted pasture costs

$$= \frac{W5 \times C5 \times S5 - T}{(1 + ii)^{PD5}} - \frac{PC}{30} \times \frac{1 - (1 + ii)^{-PD5}}{ii}$$

Appendix II

Labels Used and Their Locations

The following is a listing of the labels used in the output. They are stored as data in memory locations 30 through 46.

	<u>Label</u>	<u>Memory Location</u>
43	W	30
1713311716.	EANED	31
15132721.	CALF	32
16171524.	DECI	33
3624323100.	SION	34
1331132745.	ANALY	35
3624360000.	SIS	36
3335173617.	PRESE	37
36172727.	SELL	38
21450002.	FY1	39
21450003.	FY2	40
36453527.	SYRL	41
22211716.	GFED	42
3137000000.	NT	43
42132741.	VALU	44
1700000000.	E	45
2431334137.	INPUT	46

Appendix III

Program Listing

Display	Key	Comment							
000	76	LBL	Main Program						
001	11	A		051	05	05	101	06	06
002	22	INV		052	43	RCL	102	71	SBR
003	58	FIX		053	44	44	103	99	PRT
004	29	CP		054	69	OP	104	71	SBR
005	69	OP		055	02	02	105	34	\sqrt{x}
006	00	00		056	43	RCL	106	69	OP
007	43	RCL		057	45	45	107	06	06
008	30	30		058	69	OP	108	71	SBR
009	69	OP		059	03	03	109	99	PRT
010	01	01		060	69	OP	110	71	SBR
011	43	RCL		061	05	05	111	35	1/X
012	31	31		062	43	RCL	112	69	OP
013	69	OP		063	20	20	113	06	06
014	02	02		064	55	\div	114	71	SBR
015	43	RCL		065	03	3	115	99	PRT
016	32	32		066	00	0	116	71	SBR
017	69	OP		067	95	=	117	45	Yx
018	03	03		068	42	STO	118	69	OP
019	69	OP		069	25	25	119	06	06
020	05	05		070	43	RCL	120	98	ADV
021	43	RCL		071	21	21	121	91	R/S
022	33	33		072	55	\div	122	76	LBL
023	69	OP		073	03	3	123	23	LNx
024	01	01		074	06	6	124	53	(
025	43	RCL		075	05	5	125	43	RCL
026	34	34		076	95	=	126	01	01
027	69	OP		077	42	STO	127	65	x
028	02	02		078	26	26	128	43	RCL
029	43	RCL		079	43	RCL	129	02	02
030	35	35		080	26	26	130	54)
031	69	OP		081	85	+	131	92	RTN
032	03	03		082	01	1	132	76	LBL
033	43	RCL		083	95	=	133	33	X ²
034	36	36		084	42	STO	134	53	(
035	69	OP		085	27	27	135	53	(
036	04	04		086	03	3	136	43	RCL
037	69	OP		087	08	8	137	05	05
038	05	05		088	42	STO	138	65	x
039	98	ADV		089	00	00	139	43	RCL
040	69	OP		090	71	SBR	140	06	06
041	00	00		091	99	PRT	141	65	x
042	43	RCL		092	71	SBR	142	43	RCL
043	37	37		093	23	LNx	143	07	07
044	69	OP		094	69	OP	144	75	-
045	02	02		095	06	06	145	43	RCL
046	43	RCL		096	71	SBR	146	22	22
047	43	43		097	99	PRT	147	54)
048	69	OP		098	71	SBR	148	55	\div
049	03	03		099	33	X ²	149	53	(
050	69	OP		100	69	OP	150	43	RCL

SELL

FY1

Display	Key	Comment							
151	27	27	201	43	RCL	251	53	(
152	54	)	202	27	27	252	01	1	
153	45	Y ^x	203	54	)	253	75	-	
154	53	(	204	45	Y ^x	254	43	RCL	
155	43	RCL	205	53	(	255	27	27	
156	03	03	206	43	RCL	256	45	Y ^x	
157	54	)	207	10	10	257	53	(
158	75	-	208	85	+	258	43	RCL	
159	53	(	209	43	RCL	259	08	08	
160	43	RCL	210	08	08	260	94	+/-	
161	04	04	211	54	)	261	54)	
162	65	x	212	75	-	262	54)	
163	53	(	213	53	(	263	55	÷	
164	53	(	214	43	RCL	264	43	RCL	
165	01	1	215	11	11	265	26	26	
166	75	-	216	65	x	266	54)	
167	43	RCL	217	53	(	267	54)	
168	27	27	218	53	(	268	54)	
169	45	Y ^x	219	01	1	269	92	RTN	
170	53	(	220	75	-	270	76	LBL	
171	43	RCL	221	43	RCL	271	35	1/X	SYRL
172	03	03	222	27	27	272	53	(
173	94	+/-	223	45	Y ^x	273	53	(
174	54	)	224	53	(	274	43	RCL	
175	54	)	225	43	RCL	275	15	15	
176	55	÷	226	10	10	276	65	x	
177	43	RCL	227	94	+/-	277	43	RCL	
178	26	26	228	54	)	278	09	09	
179	54	)	229	54	)	279	54)	
180	54	)	230	55	÷	280	55	÷	
181	54	)	231	43	RCL	281	53	(
182	92	RTN	232	26	26	282	43	RCL	
183	76	LBL	233	54	)	283	27	27	
184	34	√X FY2	234	54	)	284	54)	
185	53	(	235	55	÷	285	45	Y ^x	
186	53	(	236	53	(	286	53	(
187	43	RCL	237	43	RCL	287	43	RCL	
188	12	12	238	27	27	288	08	08	
189	65	x	239	54	)	289	54)	
190	43	RCL	240	45	Y ^x	290	75	-	
191	13	13	241	53	(	291	53	(
192	65	x	242	43	RCL	292	43	RCL	
193	43	RCL	243	08	08	293	25	25	
194	14	14	244	54	)	294	65	x	
195	75	-	245	75	-	295	53	(
196	43	RCL	246	53	(	296	53	(
197	22	22	247	43	RCL	297	01	1	
198	54	)	248	25	25	298	75	-	
199	55	÷	249	65	x	299	43	RCL	
200	53	(	250	53	(	300	27	27	

Display Key Comment

301	45	Y ^x
302	53	(
303	43	RCL
304	08	08
305	94	+/-
306	54)
307	54)
308	55	÷
309	43	RCL
310	26	26
311	54)
312	54)
313	54)
314	92	RTN
315	76	LBL
316	45	Y ^x GFED
317	53	(
318	53	(
319	43	RCL
320	17	17
321	65	x
322	43	RCL
323	18	18
324	65	x
325	43	RCL
326	19	19
327	75	-
328	43	RCL
329	22	22
330	54)
331	55	÷
332	53	(
333	43	RCL
334	27	27
335	54)
336	45	Y ^x
337	53	(
338	43	RCL
339	16	16
340	54)
341	75	-
342	53	(
343	43	RCL
344	25	25
345	65	x
346	53	(
347	53	(
348	01	1
349	75	-
350	43	RCL

351	27	27
352	45	Y ^x
353	53	(
354	43	RCL
355	16	16
356	94	+/-
357	54)
358	54)
359	55	÷
360	43	RCL
361	26	26
362	54)
363	54)
364	54)
365	92	RTN
366	76	LBL
367	99	PRT
368	22	INV
369	58	FIX
370	73	RC*
371	00	00
372	69	OP
373	04	04
374	69	OP
375	20	20
376	58	FIX
377	02	02
378	92	RTN
379	76	LBL Print
380	12	B input
381	69	OP
382	00	00
383	43	RCL
384	46	46
385	69	OP
386	02	02
387	69	OP
388	05	05
389	98	ADV
390	02	2
391	03	3
392	32	X:T
393	01	1
394	42	STO
395	00	00
396	43	RCL
397	00	00
398	95	=
399	67	EQ
400	04	04

401	18	18
402	43	RCL
403	00	00
404	58	FIX
405	00	00
406	99	PRT
407	73	RC*
408	00	00
409	58	FIX
410	02	02
411	99	PRT
412	69	OP
413	20	20
414	61	GTO
415	03	03
416	96	96
417	98	ADV
418	91	R/S
419	76	LBL Auto
420	14	D Loader
421	00	0
422	42	STO
423	28	28
424	01	1
425	42	STO
426	29	29
427	02	2
428	02	2
429	32	X:T
430	91	R/S
431	76	LBL
432	15	E
433	72	ST*
434	29	29
435	01	1
436	44	SUM
437	29	29
438	44	SUM
439	28	28
440	43	RCL
441	28	28
442	67	EQ
443	11	A
444	91	R/S

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NOTE: As part of a structural reorganization, the Hawaii Agricultural Experiment Station and the Hawaii Cooperative Extension Service have been merged administratively under the name HAWAII INSTITUTE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES, College of Tropical Agriculture and Human Resources, University of Hawaii.

**Hawaii Institute of Tropical Agriculture and Human Resources
College of Tropical Agriculture and Human Resources, University of Hawaii
Noel P. Kefferd, Dean of the College and Director of the Institute**

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